

May 21, 1940.

A. J. CHILD ET AL

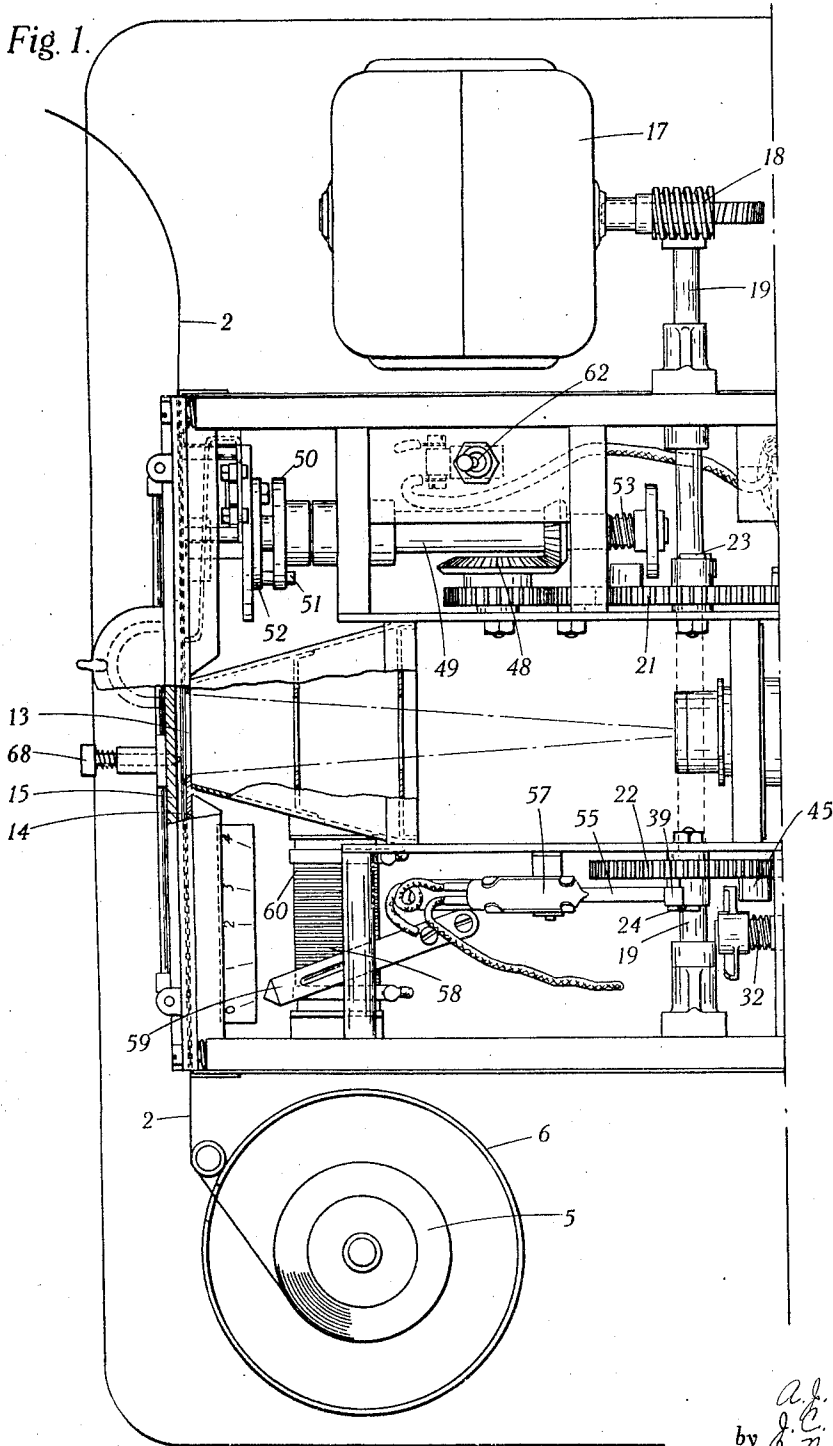
2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 1

Fig. 1.



Inventors
A. J. Child
J. C. Hall
by G. W. Stobart
Marou & Porter
Attorneys

May 21, 1940.

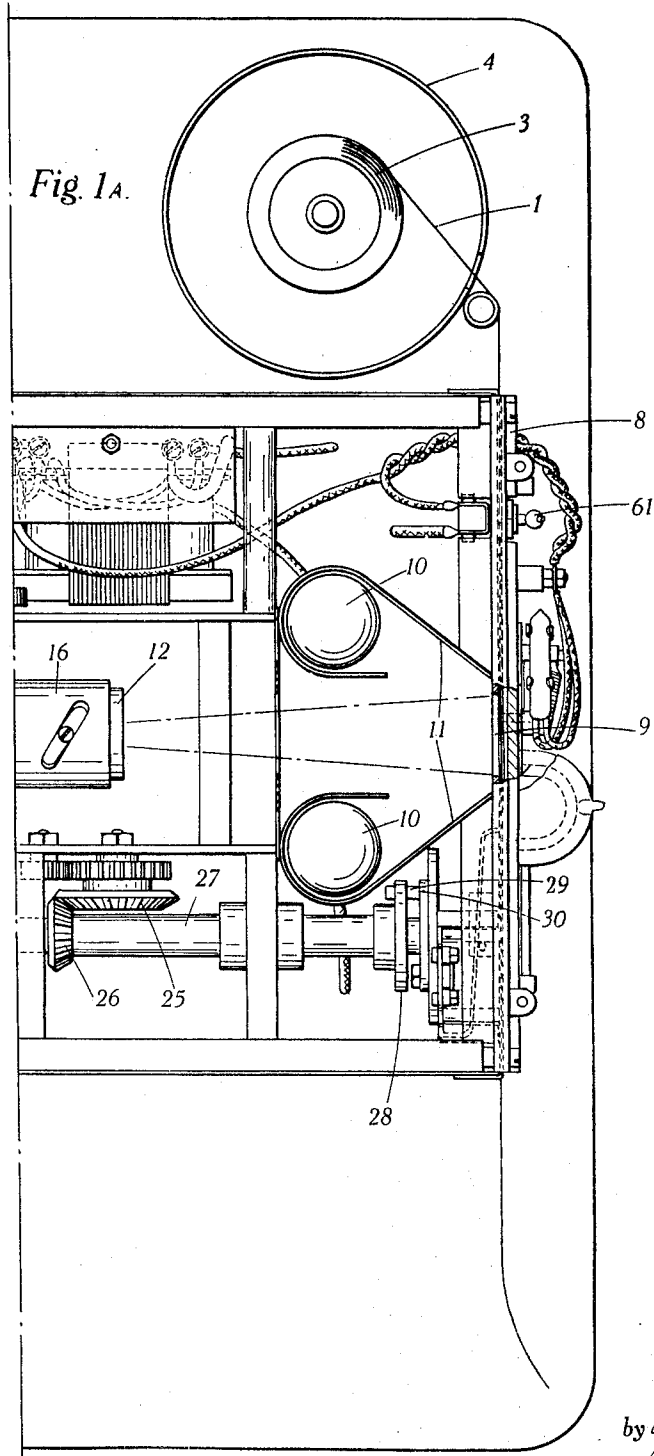
A. J. CHILD ET AL

2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets—Sheet 2



Inventors
A. J. Child
J. C. Hall
by G. T. Stobart
Mason & Porter
Attorneys

May 21, 1940.

A. J. CHILD ET AL

2,201,865

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets—Sheet 3

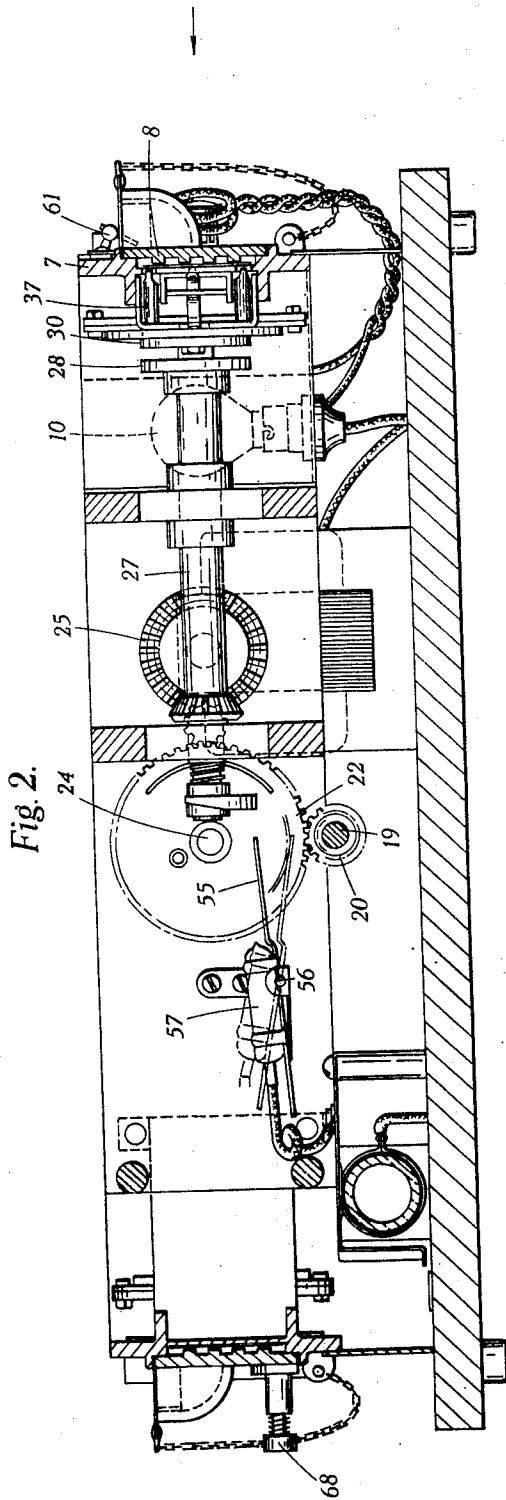


Fig. 2.

Inventors
A. J. Child
J. C. Hall
by G. W. Stobart
Mason & Porter
Attorneys

May 21, 1940.

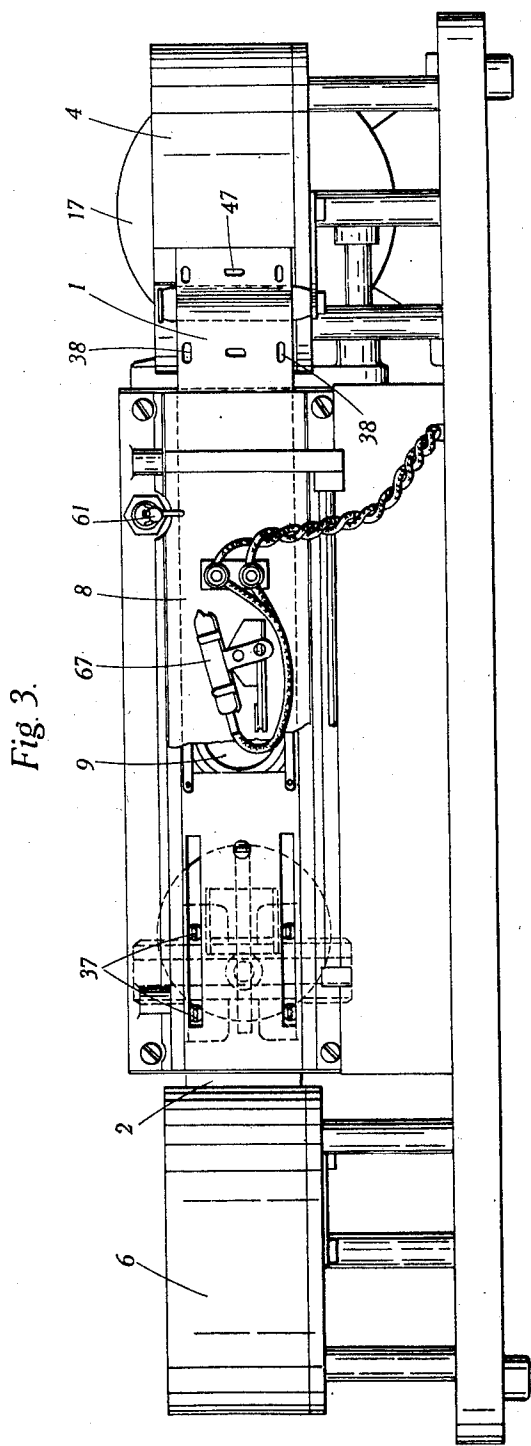
A. J. CHILD ET AL

2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 4



Inventors
A. J. Child
J. C. Hall
by J. W. Ottobast
Mason & Porter
Attorneys

May 21, 1940.

A. J. CHILD ET AL

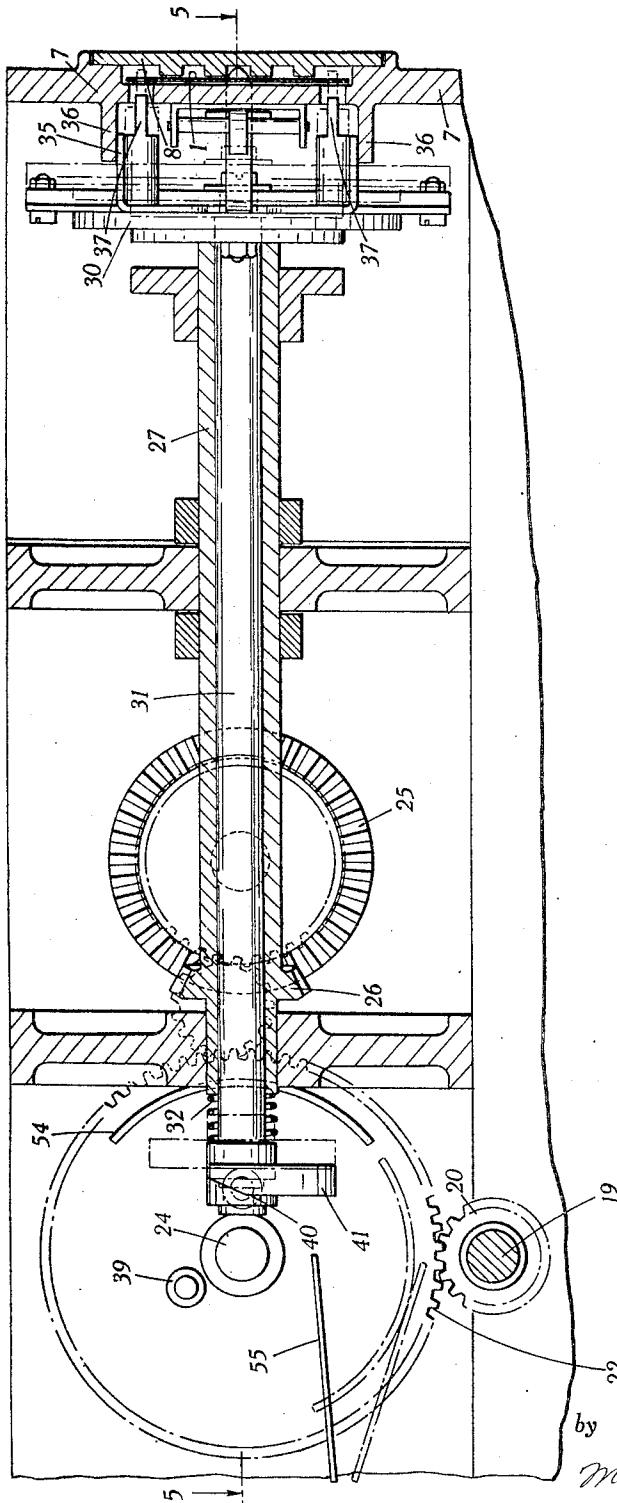
2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 5

Fig. 4.



May 21, 1940.

A. J. CHILD ET AL

2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 6

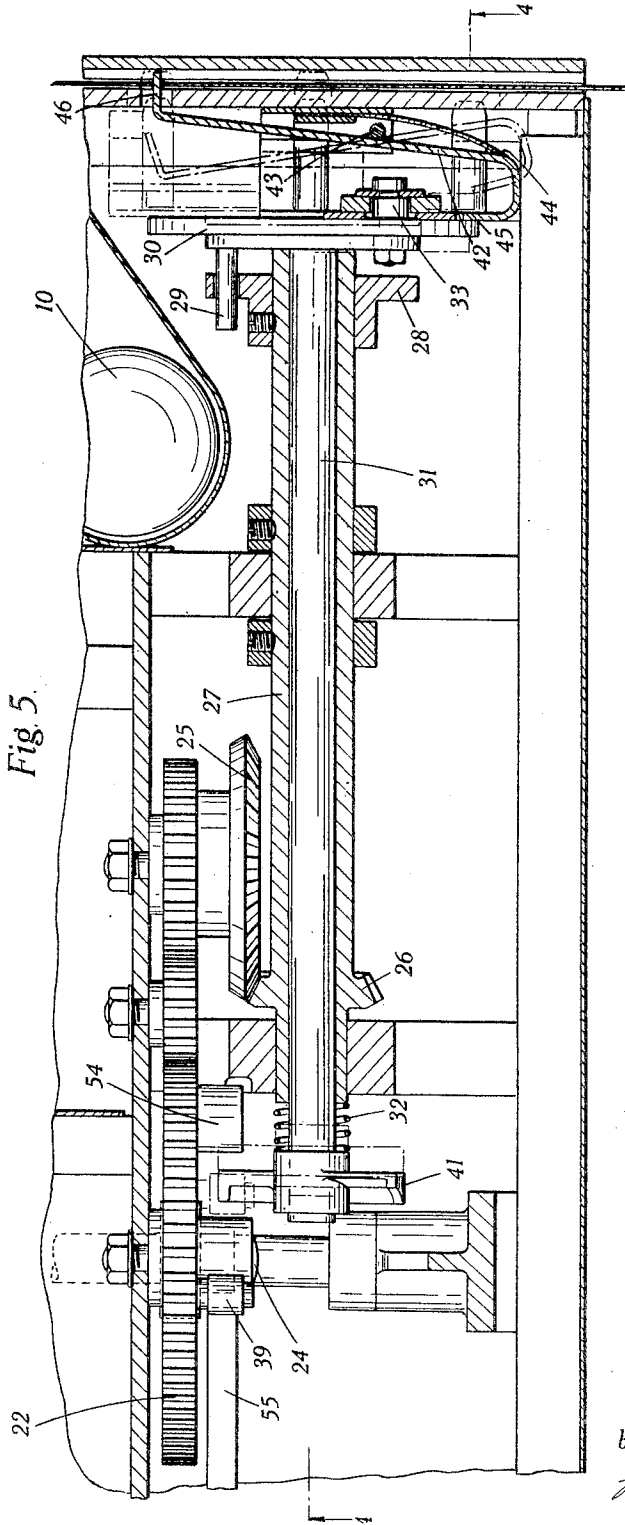


Fig. 5.

Inventors
A. J. Child
J. R. Hall
by C. W. Stobart
Maun & Porter
Attorneys

May 21, 1940.

A. J. CHILD ET AL

2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 7

Fig. 6.

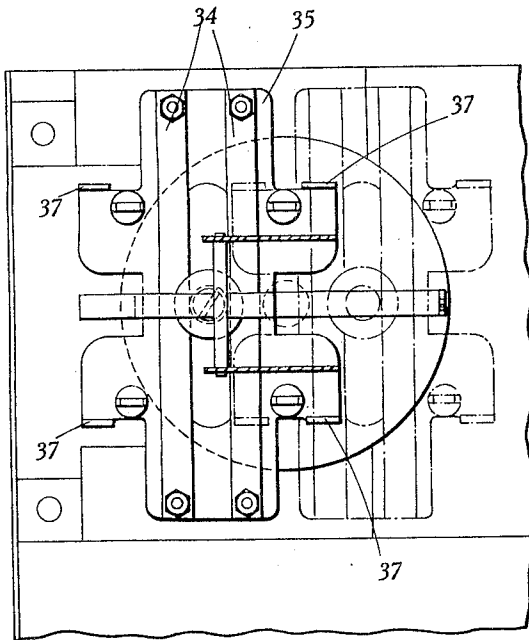


Fig. 7.

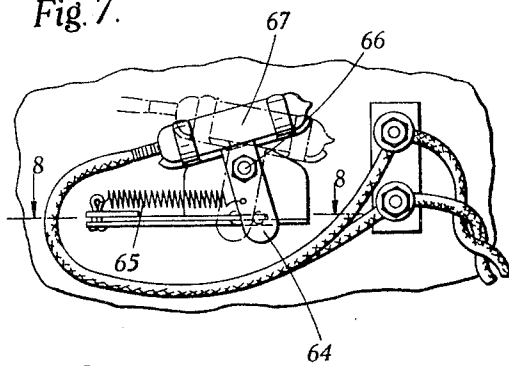
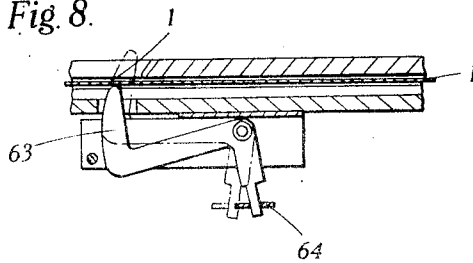


Fig. 8.



Inventor
A. J. Child
by J. C. Hall
J. T. Stobart
Mason & Potter
Attorneys

May 21, 1940.

A. J. CHILD ET AL

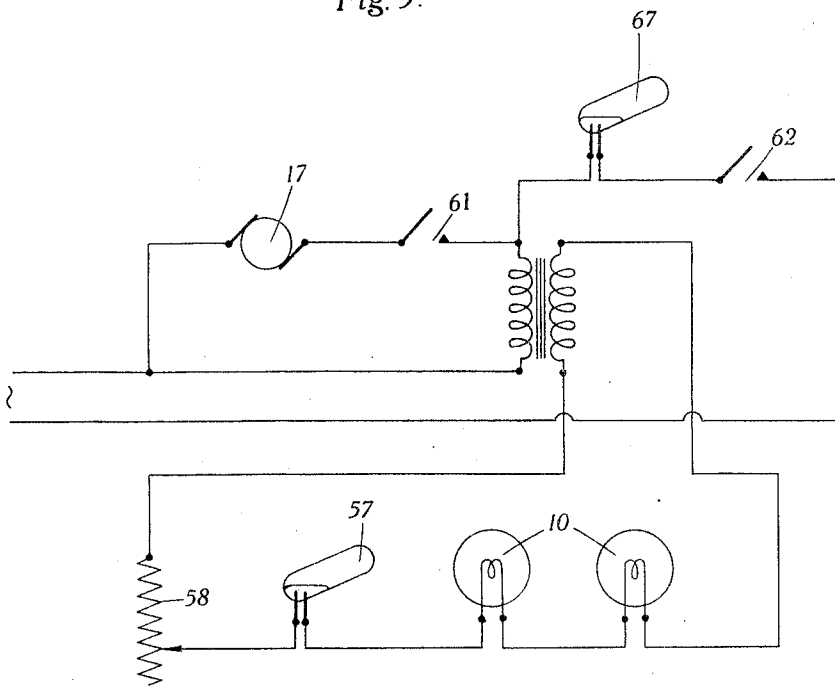
2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Filed March 6, 1939

8 Sheets-Sheet 8

Fig. 9.



Inventors
A. J. Child
J. B. Hall
by J. N. Stout
Wason & Foster
Attorneys

Patented May 21, 1940

2,201,885

UNITED STATES PATENT OFFICE

2,201,885

PHOTOGRAPHIC PRINTING MACHINE

Arthur James Child, Bushey Heath, James Charles Hall, Wimbledon, London, and John William Stobart, Merton, London, England, assignors of one-fourth to William Smith, London, England

Application March 6, 1939, Serial No. 260,180

In Great Britain March 10, 1938

1 Claim. (Cl. 88—24)

The present invention relates to improvements in photographic printing machines.

According to the present invention a picture strip illuminated by a source of artificial light is displaced step by step relatively to a lens system projecting an image thereof on to a sensitized strip also displaced step by step in synchronism with the picture strip.

Synchronism of displacement of picture strip and sensitized strip may be obtained by driving both strips from a common driving shaft.

The invention is more particularly described with reference to the accompanying drawings, in which:

Figures 1 and 1A constitute a plan view of one form of machine.

Figure 2 is an end sectional elevation.

Figure 3 is a corresponding end view.

Figure 4 is a detail view of part of Figure 2 on an enlarged scale and on the line 4—4 of Figure 5.

Figure 5 is a plan sectional view corresponding to Figure 4 on the line 5—5 of Figure 4.

Figure 6 is a front detail elevation of the feed dogs for the strip.

Figure 7 is a detail view of a device to prevent operation of a machine in the absence of film or strip or where this may be broken.

Figure 8 is a corresponding sectional view on the line 8—8 of Figure 7.

Figure 9 is a wiring diagram.

A picture strip 1 having lettering thereon or a series of pictures which are to be copied upon a sensitized strip 2, is fed from a reel 3 in a housing 4 whilst the sensitized strip 2 is fed from a reel 5 in a housing 6. Either or both of these strips may be throughout guided through light-tight casings.

The strip 1 is fed through a gate formed between the end of a casing 7 of the machine and a hinged front 8 being led past an opening 9 to receive illumination from a pair of lamps 10 disposed in reflectors 11 so that an image of the indicia or picture in the opening 9 is transmitted by a lens combination in a housing 12 upon an opening 13 in which the sensitized strip 2 is exposed on the opposite side of the machine, which sensitized strip is similarly led between an end plate 14 of the casing and a detachable end plate 15.

A sleeve 16 is provided on the lens housing 12 for adjusting the focusing of the lens combination therein.

The strips 1, 2 are displaced step by step in synchronism and in the present case in opposite directions by means of a drive from an electric

motor 17 driving through worm and worm wheel gearing 18 a shaft 19 having geared connection 20 (Fig. 2) with a pair of gear wheels 21, 22, on counter-shafts 23, 24 respectively. The gear wheel 22 drives through a train of gears, a bevel wheel 25 meshing with a second bevel wheel 26 on a sleeve 27.

This sleeve 27 has a disc 28 upon it provided with a perforation engaging with a pin 29 on a disc 30 formed on a spindle 31 (Fig. 5) mounted within the sleeve 27 so that the spindle 31 can be displaced axially against a spring 32 without interrupting the drive between itself and the sleeve 27. The rotating disc 30 has a pin 33 (Figs. 5 and 6) upon it engaging between a pair of vertical guide ribs 34 (Fig. 6) on a plate 35 guided in longitudinal guides 36 on the end plate 7 of the frame and this plate 35 has two pairs of feed dogs 37 adapted to engage in perforations 38 of the picture strip 1 and feed this step by step forward as the slide 35 is moved to and fro in the guides 36 from the position shown in full lines in Figure 6 to that shown in chain dotted lines and back again.

The feed dogs 37 will, however, only be engaged in the perforations 38 of the strip 1 in one direction of movement in that they will be periodically retracted by reason of the axial displacement of the spindle 31 under the reaction of the spring 32 being moved forward into engagement with the perforations 38 in the strip 1 whenever the spindle 31 is displaced against the action of the spring 32 by means of a pin or roller 39 engaging the bevel end 40 of a cam 41 on the end of this spindle 31 to displace it into the position shown in chain dotted lines in Figures 4 and 5.

Means may be provided to prevent the accidental movement back of the picture strip 1 and also which may serve as means to positively hold it when moved forward by the feed dogs 37 which may consist of a yoke 42 pivoted at 43 engaged by a leaf spring 44, the end 45 of which yoke 42 bears against the edge of the disc 30 so that when this is in the retracted position shown in full lines in Figures 4 and 5 a locking pin 46 at the opposite end of the yoke may engage with either a special perforation 47 in the picture strip or may be adapted to engage in a pair of perforations 38 as desired.

The drive is taken from the pinion 21 through a train of gearing to a bevel wheel 48 on a sleeve 49 having a disc 50 engaging a pin 51 on a plate 52 on the axially displaceable spindle 53 operating feed dogs for the strip 2 in precisely similar manner as has been described in the drive for

the strip 1 so that these strips are fed step by step in synchronism with one another.

It will be preferred to extinguish the lights 10 during the time in which the strips 1 and 2 are being moved in the gates but this is not essential. When, however, the lights are so extinguished this is effected automatically by means of a cam surface 54 on either the wheel 22 or the wheel 21 which is adapted to come into contact with and hold depressed the end of a lever 55 pivoted at 56 to the frame and supporting a mercury or the like gravity switch 57 in circuit with the lamps 10 and preferably also in circuit with a rheostat 58 adjustable by means of a contact finger 59 movable over a scale 60 so that the amount of illumination can be set as desired.

A switch 61 is preferably disposed as shown controlling the motor circuit 17 and lamp circuit 10 so that all feed to the strips is interrupted whenever the front of the casing 8 is opened as this cannot be opened without operating the switch 61. This is useful to allow the feeding in of the end of a fresh picture strip.

A parallel switch 62 may be provided at any convenient place so that the light to the lamps can be switched on with the motor 17 stopped.

It would be preferred to provide automatic means for interrupting the feed should the picture strip 1 become broken or exhausted. This may, for instance, comprise a finger 63 bearing lightly against the picture strip 1 and engaging in one end of an arm 64 drawing to the right in Figure 7 by means of a spring 65, which arm 64 is pivoted at 66 and carries on it a mercury or gravity switch 67. It will consequently be seen that whenever the picture strip 1 becomes exhausted or broken the finger 63 will pass into

the position shown in chain dotted lines in Figure 8 under action of the spring 65 to allow the mercury switch to move into the position shown in chain dotted lines in Figure 7 and thus break the circuit to the motor 17.

It may be desirable to provide a visual indication upon the sensitized strip 2 at certain points and for this purpose a spring controlled perforator 68 is provided on the end cover for the casing of this strip 2.

Reflective masks may be provided on one or more sides of the opening in the casing upon which various letterings may be mounted, so that such lettering becomes photographed on the sensitized strip at each operation.

We claim:

A photographic printing machine comprising means to guide a perforate picture strip, means to guide a perforate sensitized strip, a main shaft, a pair of counter-shafts geared thereto, a pair of plates opposite said strips, means to guide said plates axially of said strips, feed dogs on said plates engaging the perforations in said strips, a pair of rotating crank pins engaging with said plates to oscillate them to and fro, driving shaft connections between said crank pins and said counter-shafts, cam means driven from said counter-shafts to displace said plates laterally of said strips, means to engage a stop pin with at least one of said strips at times when the feed dogs are disengaged therefrom and punch means mounted on at least one of said cover plates, whereby a strip can be marked at will.

ARTHUR JAMES CHILD.
JAMES CHARLES HALL.
JOHN WILLIAM STOBART.